Leica SP9000

Automatic knife sharpener

Instruction Manual

Leica SP9000 V2.2 English – 08/2007

Always keep this manual near the instrument.
Read carefully prior to operating the instrument.

Leica
MICROSYSTEMS

IMPORTANT NOTE

The information, numerical data, notes and value judgments contained in this manual represent the current state of scientific knowledge and state-of-the-art technology as we understand it following thorough investigation in this field. We are under no obligation to update the present manual periodically and on an ongoing basis according to the latest technical developments, nor to provide our customers with additional copies, updates etc. of this manual.

For erroneous statements, drawings, technical illustrations etc. contained in this manual we exclude liability as far as permissible according to the national legal system applicable in each individual case. In particular, no liability whatsoever is accepted for any financial loss or consequential damage caused by or related to compliance with statements or other information in this manual.

Statements, drawings, illustrations and other information as regards contents or technical details of the present manual are not to be considered as warranted characteristics of our products. These are determined only by the contract provisions agreed between ourselves and our customers.

Leica reserves the right to change technical specifications as well as manufacturing processes without prior notice. Only in this way is it possible to continuously improve the technology and manufacturing techniques used in our products.

For the instrument serial number and year of manufacture, please refer to the name plate at the back of the instrument.

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Year of manufacture: .....

Country of origin: ...Federal Republic of Germany

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1.1 Symbols used in this manual and their meaning

Warnings
appear in a grey box and are marked by a warning triangle: 

Useful notes,
i.e. important user information appear in a grey box and are marked by an information symbol: 

(5)
(Fig.5) **Figures in brackets refer to item numbers in drawings or to the drawings themselves.**

Instrument type:
All information given in this instruction manual applies only to the instrument type indicated on the title page.

A name plate, indicating the instrument serial number, is attached to the back of the instrument.

Required information for all inquiries:
For any inquiries please specify:
- Instrument type
- Serial number

General

This instruction manual includes important instructions and information related to the operating safety and maintenance of the instrument.

The instruction manual is an important part of the product. It must be read carefully before using the instrument for the first time and must always be kept with the instrument.

If additional requirements, which exceed the scope of this manual, are imposed by regulations and/or laws on accident prevention and environmental protection in the country of operation, appropriate instructions for compliance with such requirements must be added to this manual.

Read this instruction manual carefully before attempting to work on or operate the instrument.

Please pay particular attention to chapter 2 (safety features, safety instructions).
– Please read this information, even if you are already familiar with the operation and use of other Leica products.

1.2 Designated use / misuse

- The Leica Automatic Knife Sharpener is specifically designed to quickly and accurately hone microtome knives to a precise and fine cutting edge. Additionally, provision has been made to eliminate the tedious task of manually redressing the honing plates. In total, the new sharpener will provide you with greatly increased efficiency in honing, convenience in redressing plates, and a considerable amount of valuable time saved.
- The instrument may only be operated according to the instructions contained in this manual.
- Any other use of the instrument is considered contrary to its designated use.

1.3 Selection and qualification of personnel

- The automatic knife sharpener SP9000 may only be operated by trained laboratory personnel.
- Prior to starting work with the instrument, all laboratory personnel designated to operate the instrument must carefully read the present instruction manual and must be familiar with all technical features of the instrument.

2.1 General information on instrument design and safe handling

This instrument has been built and tested in accordance with the safety regulations for electrical measuring, control, regulating and laboratory devices.

In order to maintain this condition and ensure safe operation, the operator must observe all the instructions and warnings contained in this instruction manual.

For current information about applicable standards, please refer to the CE declaration of conformity on our Internet site:

www. histo-solutions.com

2.2 Safety instructions for handling the instrument

Potential hazard

Caution: risk of injury when touching the knives and blades as these are extremely sharp.

Warning: Avoid touching live parts under any circumstances!
2.2 Safety instructions for handling the instrument

Correct behavior

Make sure to handle knives and blades very cautiously!
Never touch the cutting edge of knives and blades!
Do not leave knives, blades and bladed knife holders unprotected.

The instrument cover may only be removed by qualified service personnel!
Before removing the cover, ensure that the instrument is unplugged.

3. Instruments properties

3.1 Technical Data

Power supply :

Model 930 is 115 V / 60 Hz
Model 940 is 230 V / 50 Hz

Overall Dimensions :

Width : 370 mm
Height : 460 mm
Depth : 540 mm

3.2 General Description

Your technical skill is the key to the successful performance of any laboratory equipment. While the Leica Microtome Knife Sharpener is efficient and simple to operate, the results you get depend entirely on your knowledge of how badly damaged the knife is and how to determine when your knife is to be sharpened.
Consequently, careful microscopic examination of the edge and facets is necessary before you start to resharpen, so you can decide on the amount of coarse honing required. Also, when you complete the coarse and fine honing procedure, it is recommended that the knife be examined microscopically, to assure yourself that good results have been obtained.

The unit is designed to sharpen Leica Histostat knives up to 250 mm in length. Do not attempt to sharpen any Leica knife with the Knife Sharpener that has been previously sharpened by another method unless it has first been factory reconditioned by Leica.

See later section on reconditioning for information on restoring knives, eliminating large nicks, etc.

While under certain specific conditions competitive knives may be sharpened on the Leica Knife Sharpener, optimum results cannot be assured.

3.3 Overview - SP9000

4.1 Check list

The Leica Microtome Knife Sharpener is shipped with all accessories required for coarse and fine knife honing of knife edges and for dressing glass hone plate surfaces when necessary.

1. Coarse abrasive, 2 bottles, for coarse honing procedure.
2. Fine abrasive, 2 bottles, for fine honing (final sharpening).
3. Hone glass compound, 2 bottles, dressing for glass plates.
4. Two glass hone plates, both sides are identical, providing four usable honing surfaces.
5. Knife inspection block (hardwood), used to hold knife et proper angle for inspection of cutting facet with microscope.
6. Bridge assembly maintains pressure on glass plates during glass hone plate resurfacing.

4.2 Installing the instrument

1. Place the sharpener on a sturdy table or laboratory bench and remove tags and retaining tape used for shipment.
2. Assure that the plastic cover fits securely upon the base and is firmly supported when opened.
3. Be sure that the push-button switch is „OFF". Plug the instrument into a GROUNDED receptacle providing the voltage and frequency indicated on the data plate at the rear of the instrument.
4. Select the proper knife holder for the length of knife to be sharpened. The standard knife holder (no holes through back) is used for all Leica knife blades up to 185 mm in length. For 250 mm length knives, use the special knife holder (two round holes through back). Improper matching of knife length can be dangerous and can cause damage to the cutting edge.
5. To attach the knife holder to the knife carrier arm, turn the arm, by hand, so that the pin is vertical **(Figure 11.1)**. Position the knife holder so that the blade clamps are „UP".
6. Slide the knife holder onto the shaft until the „slot" in the holder completely engages the pin and is seated firmly against it. Tighten locking screw securely **(Figure11.2).**

Do not operate instrument without knife in holder ... to do so may cause damage.

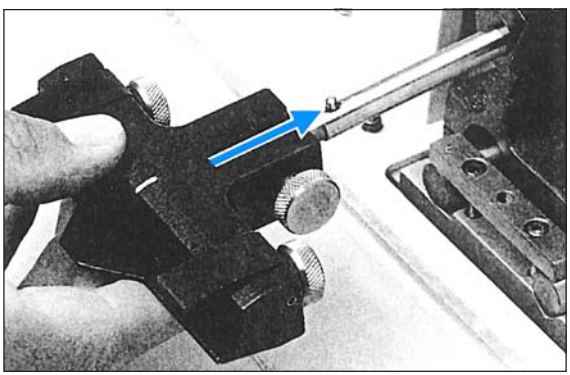


Abb. 11.1

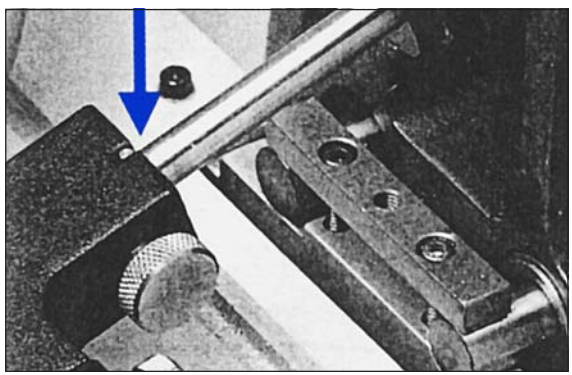


Abb. 11.2

Key to sharpening success

The starting point of any successful sharpening technique is the careful examination of the condition of the knife edge using a microscope. Periodic re-examination during sharpening is equally important.

Please remember !

The width of the entire cutting facet is only from 0.1 to 0.6 mm, and nicks in the edge due to normal use are just a few microns deep. Therefore, there simply is no satisfactory substitute for the use of a good microscope in knife inspection. The microscope should be equipped with a measuring device such as an eyepiece reticle.

There are two basic methods of illuminating the knife for examination: When studying the surface of the cutting facet to check for smoothness and uniformity of bevel, „reflected light" is used as shown in **Figure 12.1**. The lamp is positioned so the light is directed on the knife facet.
When you wish to study only the edge of the knife to observe for presence and measurement of nicks, „transmitted light" is used as shown in **Figure 12.2**.
In both instances above, it is recommended that you examine the knife at 100 X resultant magnification. Always wipe the edge with a clean cloth moistened with solvent such as xylene before examining.

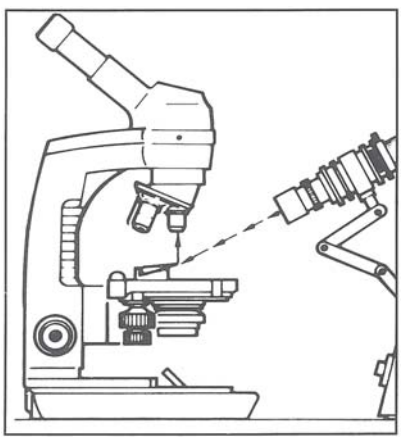


Abb. 12.1

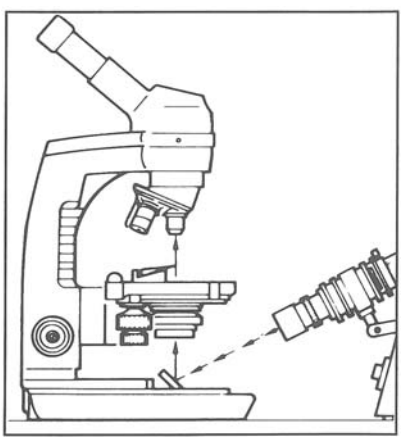


Abb. 12.2

For the first resharpening of a new Leica knife or one that has been factory reconditioned by Leica, the honing process must begin with coarse honing. This is necessary in order to develop the second facet as is explained in the section on „Factory Reconditioning".

Again, please note that microscopic examination of the knife before and after honing is the only proven method of determining how much honing time is required and when coarse honing has been completed.
In coarse honing, it is important to remember that the sharpening process begins at the back of the cutting facet and gradually moves toward the front edge of the knife. The highly efficient honing process is dependent on four factors:

1. Backward and forward movement of the knife arm to which the knife and holder are attached.
2. Automatic turnover of the knife at the end of each cycle for equal honing of both knife sides.
3. A solenoid applies approximately 4 pounds of pressure to the knife when the coarse button is pushed.
4. An undulating motion of the honing plate is coupled with its back and forth movement that moves contrary to the knife arm.

Before starting any procedure, be certain that the „OFF"- button is depressed.

5.1 . Inspect for presence and size of nicks

Clean knife edge with solvent such asxylene. Place the knife on the microscope and inspect the edge for presence and size of nicks. Also, note the other surface characteristics of the cutting facet to more easily recognize the "changes" that will take place during coarse honing.

5.2. Put honing plate on holder

Two plates are supplied, each with two usable sides. When the plate is properly positioned, tighten the thumbscrew. **(Figure 14)**

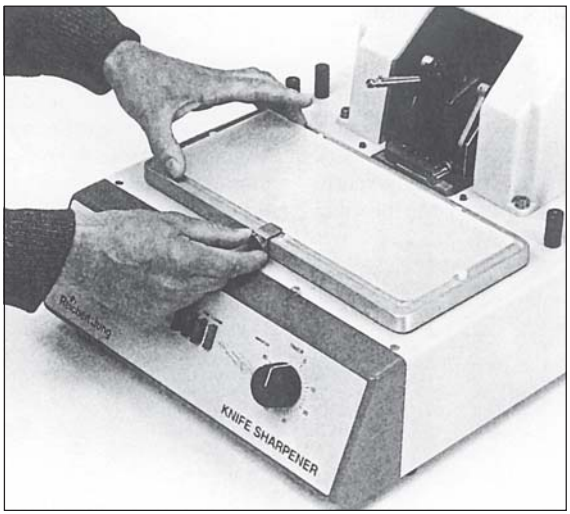


Fig. 14

Thumbscrew should be finger tight. Excessive tightening may damage plastic plate positioning pins.

5.3. Apply coarse abrasive to the plate

(Shake the abrasive very thoroughly until all particles are in suspension. If necessary remove dispenser top and stir to mix contents.) Squeeze a narrow „ribbon" (about the width of a pencil) of the coarse abrasive on the glass plate. The „ribbon" should be approximately equal in length to the knife being sharpened. Apply coarse abrasive at least an inch inside the front edge of the plate. Do not permit plate to run dry; add abrasive if needed. Avoid using excess or abrasive will „pile up" on plate and may necessitate cleaning of knife holder.

Be sure that the knife holder used matches the length of the knife to be sharpened. See "Installation" on Page 5. Use of the wrong knife holder be hazardous and may cause damage to the knife edge can be hazardous and may cause damage to the knife edge.

5.4. Attach knife

With the two clamps facing ‚up" and clamp screws loosened, install knife so that the end with the **Leica trademark to your right** (**Figure 15.1**). This places the slotted end of the knife to your left as you face the front of the Leica Knife Sharpener. Tighten the two clamp screws until the knife is safely, but temporarily, fastened.

Always sharpen longest knives first.

5.5. Centre the knife using a ruler

Carefully centre the knife for proper balance during honing. Use a ruler and adjust knife position until you can measure exactly the same distance from the outside edge of each clamp to each end of the knife (**Figure 15.2**). Keep the knife evenly snug against the back of the holder. Gradually tighten the two clamp screws - alternating from one to the other - until the knife is held in place.

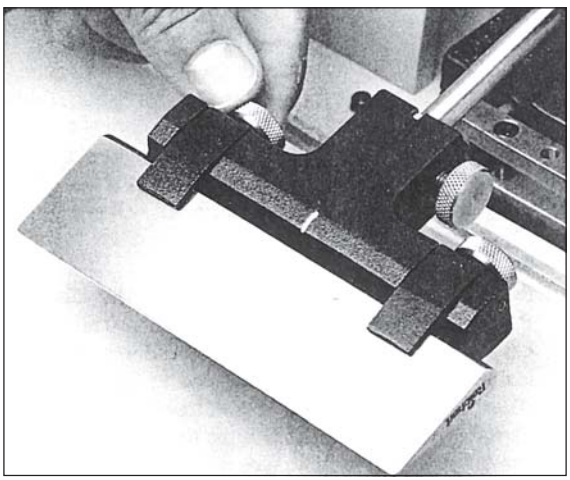


Fig. 15.1

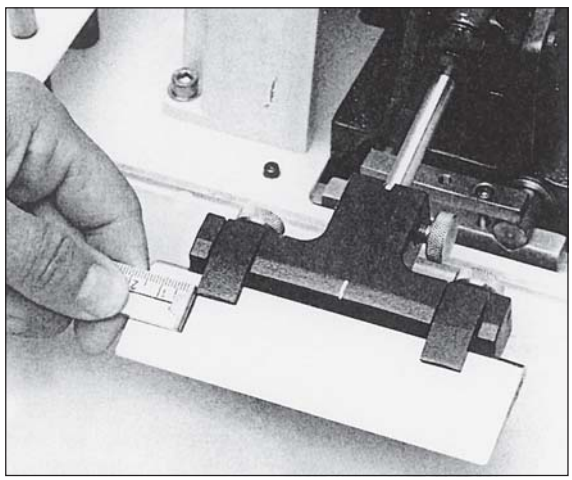


Fig. 15.2

5.6 Set coarse honing knob

Switch the coarse honing knob on the left-hand side of the control panel fully to the left so the direction of the knob is towards „Coarse".

5.7 Set Timer at 30 minutes

When beginning coarse honing operation, set the automatic timer for 30 minutes. This initial setting of 30 minutes holds true for knives being sharpened for the first time on the Leica Knife Sharpener as well as those previously sharpened on this instrument. Close plastic cover.

5.8 Push the blue coarse button on the control panel

The solenoid will lock in and release automatically with each turn of the knife. The knife is automatically stroked against the undulating honing plate. After the equivalent of three full strokes on one side, a cam follower automatically turns the knife and hones the other cutting facet again using three strokes. Cycle is repeated continuously until time has run out.

5.9 Remove knife carefully

At the end of the time cycle, the knife holder will stop in a raised, horizontal position. Loosen clamp screws and remove knife. As a safety precaution and for ease of handling, insert a knife handle into the slot on the left side of the knife (Figure 9).

If the holder should stop upside down (knife clamps facing downward), turn the automatic time knob beyond the 10 minute setting. Wait until the knife starts to move upward and then turn timer to „zero". The knife holder will then go through a half cycle and stop in the correct, raised position. Shut off Machine by depressing „OFF" button.

5.10 Clean knife - inspect condition

Wipe knife with clean cloth moistened with solvent and inspect the cutting facet under a microscope (100X). Keeping in mind that the coarse honing action proceeds from the back of the facet to the edge of the knife, check to see how much of the surface has been honed. Because each knife and its condition is different, no specific time can be given to achieve the results illustrated.

5.11 Clean glass plate - continue Coarse Honing if necessary

Wash the glass hone plate with a detergent under hot running tap water to remove abrasive and fine metal particles. Wipe dry. If you feel further coarse honing is necessary apply fresh, coarse abrasive and continue honing as required. Inspect periodically to check progress. Add abrasive as needed. Wash hone plate when abrasive becomes a dirty, raish colour.

With experience you will soon be able to determine when you have a good, even coarse facet, uniform in appearance and have completely removed the single, factory facet-or-the fine, cutting facet produced by the Leica Knife Sharpener.

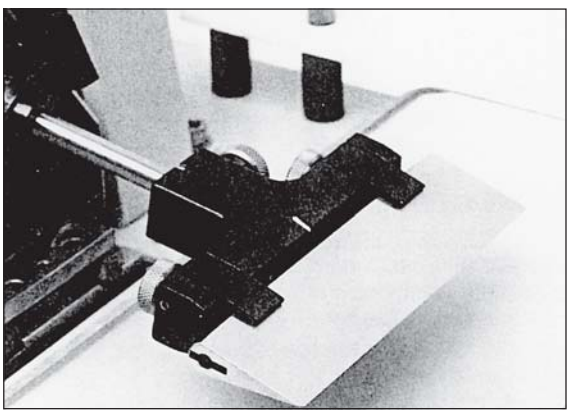


Abb. 17

Coarse honing must be followed by fine honing using the Leica Fine Abrasive. As illustrated in Figure 10, the coarse honing action produces a single facet. In proceeding with the fine honing operation, a second cutting facet is ground on the knife at the cutting edge as shown in **Figure 18**.

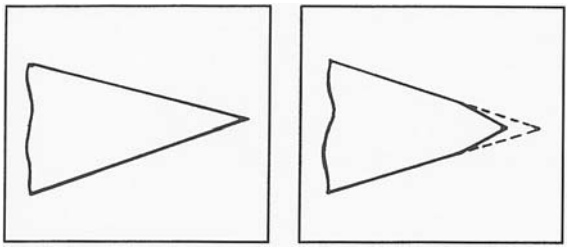


Fig. 18

Either plate may be used for fine honing (either side), but be especially careful to remove all coarse honing abrasive and honing remnants from the plate and knife. Washing both under hot running water and using ordinary detergent should suffice. Wipe dry.

The width of the fine facet is not of significance. This will vary from one knife to the next. Also, this width often varies from one side of a particular knife to the other; however, this fine facet should be approximately the same width from one end of the knife to the other end. (See page 26 for comments on typical sharpening problems.) While the above should be kept in mind, the most critical factor in judging the success of fine honing is the degree to which the small, remaining nicks are removed. Nothing exceeds this in importance! Exactly how microscopically free of nicks the knife edge must be, depends, of course, on the thickness of the tissue sections being cut. For example, with a four-micron nick in the knife, you cannot obtain a satisfactory section five microns thick because of a ‚tearing" action. However, with a ten-micron section, results may be acceptable although not uniformly even.

Your Leica Knife Sharpener . . .

is capable of producing an edge so near to perfection that subsequent hand stropping will only result in „turning over" the edge. Do not strop!

The fine honing procedure is identical to coarse honing with three exceptions:

1. Lower honing plate to fine honing position by turning honing dial on the left-hand side of the control panel fully to the right. Note red dot.

2. Apply a ribbon of the Leica Fine Abrasive to the plate. After extensive testing, it was determined that the Fine Abrasive is a superior abrasive and produces a finer polished facet. This new abrasive has the following advantages.

a. Improved performance. Sharpening in the fine honing cycle will be considerably reduced. Failure to use the Leica Fine Abrasive may result in the accumulation of metal particles on your hone plate which will damage the edge.
b. Leica Fine Abrasive is in suspension and will not settle out. It requires no shaking or stirring.
c. Leica Fine Abrasive is water soluble and hone plate cleaning is accomplished easily under running water. If a film remains on the knife, it should be carefully wiped with a soft cloth.

3. Set timer to 10 minutes and push red fine honing button in the centre of the control panel. Note the solenoid, which applied pressure to the knife in coarse honing, is not engaged. After the 10 minute period, examine the knife and continue additional honing if necessary.

After Fine Honing is Complete

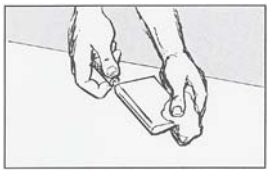


Abb. 20.1

Shut off instrument by depressing ‚OFF" button. Clean knife and wipe dry carefully **(Figure 20.1)**. Where atmosphere is corrosive and the knife is to be stored for any length of time, lubricate with a good grade of light, neutral oil.

After the knife has been used, only a ‚touch up" of the edge, using fine honing may be sufficient to restore cutting qualities. (Never strop.) Much will depend upon the type of tissue and desired thickness of the sections. Again, microscopic examination will assist you in determining what is necessary.

As illustrated in **Figure 20.2**, fine honing is complete. Note the even width of the fine facet (from end to end of knife). Small knicks have been satisfactorily removed. Microscopic „S" - shaped lines on fine facet are a normal result of polishing action and do not affect cutting qualities.

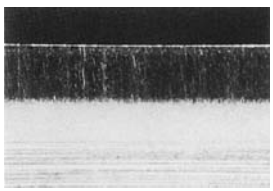


Abb. 20.2

In redressing hone plates the switch will stop the action of the hone table when the timer runs out only if the knife carriage assembly is in a normal stop position. It is essential therefore, that the previous cycle be allowed to run to completion and the „OFF" button be depressed to prevent any further movement of the carriage.

In order to eliminate excessive redressing time on the hone plates, it is suggested that users accumulate no more than three or four hours sharpening time on any plate surface.
The honing action of the knife against the frosted surface of the glass plate will eventually cause a ‚shiny" path to be worn on the face of the plates as wide as the length of the knife. The number of hours before the appearance of a shiny area depends upon the type of abrasive most frequently used.
When such a shiny surface exists, time required for proper honing increases substantially. Coarse honing, in particular, becomes very time consuming. Also, should one attempt to sharpen a knife that is longer than the worn part of the plate, correct honing becomes impossible. The ends of the longer knife will ride high on microscopic shoulders (areas still frosted) and the centre will not make proper contact on the shiny, worn area.
To economize time, most technicians wait until both glass hone plates require dressing. In addition, if desired, each side of the two plates can be dressed during the same procedure thus restoring the frosted appearance to all four identical plate surfaces.

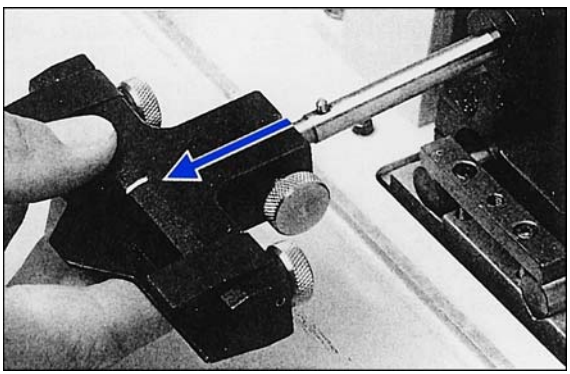


Abb. 21.1

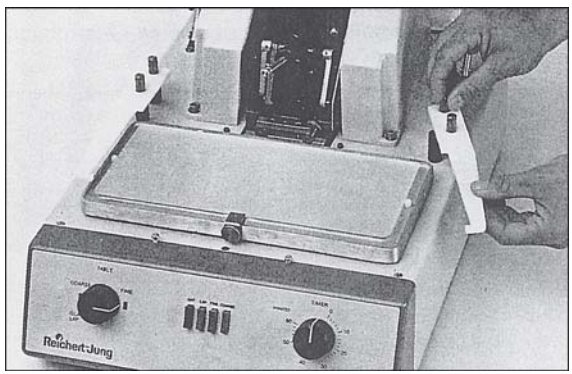


Abb. 21.2

1. Depress "OFF" button.
2. Remove knife holder from arm (Figure 14) and raise arm approximately 1-1/2". Turn the‚Table" dial completely to the left to the ‚Coarse/Glass Lap" position.

3. If the plastic glass retainers are not in place, install them on the posts on the platform and tighten the two thumb screws in each one (Figure 15).

The two glass retainers may be left in place during knife sharpening.

4. Position one hone glass on the plate holder and tighten thumbscrew (finger tight only). Be sure that the top surface of the clamp is below the top surface of the glass (Figure 16).

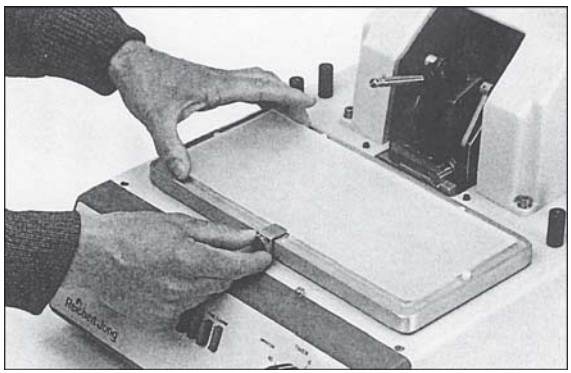


Abb. 22.1

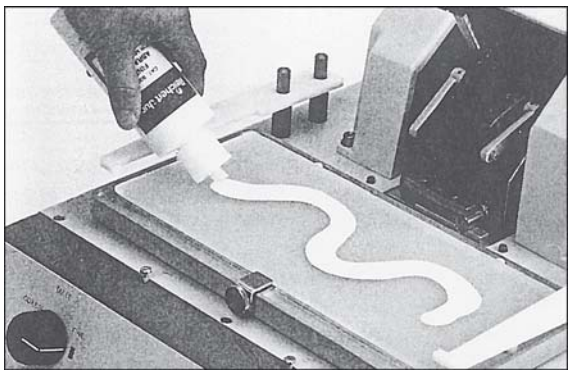


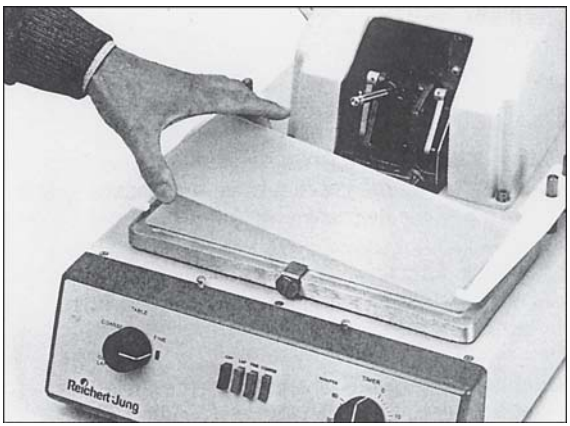
Abb. 22.2

5. Shake Leica Hone Glass Compound thoroughly until all particles are in suspension. If necessary, remove dispenser top and stir to mix contents. Apply an ‚S" shaped line of compound over the surface of the plate (Figure 17). There must be sufficient compound so that the entire plate surface will be covered when the second plate is inserted and redressing begins.

USE ONLY LEICA HONE GLASS COMPOUND. DO NOT USE DRY ABRASIVE.
ALL TRACES OF HONE GLASS COMPOUND MUST BE REMOVED FROM GLASS PLATES BEFORE SHARPENING KNIVES.

6. Place the second plate between the two glass retainers so that it is lying flat. It is unimportant as to which side is down first (Figure 18).

7. Insert the two lips of the bridge assembly into the slot behind the front panel. Then, with the spring mounted suction cups on the top plate, press down on the bridge and tighten the thumb screw (Figure 19).
8. Set the timer for 10 minutes and push the „LAP“ button.
9. When the machine stops, wash the plates and inspect their condition. Repeat with fresh hone glass compound. After 20 minutes of redressing, wash each plate thoroughly under running water and dry completely. Inspect for uniform, frosted appearance over the entire surface of each plate. If there is a „shadowy” indication of the shiny area still present, repeat the above procedure until a uniform surface is obtained.
10. When you are satisfied with both plates, turn over both plates and repeat the process.
11. Test glass hone plates for „flatness”. After plates are properly dressed and dried, they can be tested for flatness in the following manner: Bring the plates into contact (dressed surfaces together) with a sliding, circular motion until edges match. Lift the top plate with your fingertips. If both plates are perfectly flat, the bottom plate will cling to the top plate and raise with it, about 1/2 inch, until its own weight finally pulls it free.



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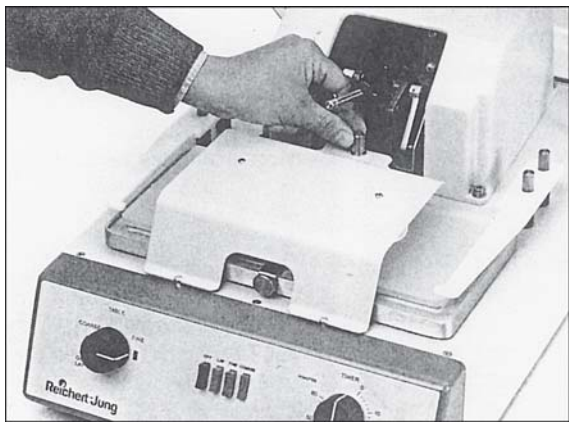
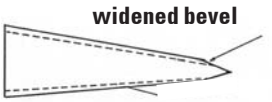


Abb. 23.2

7. Redressing hone glass plates



Surface must be factory ground to restore proper bevel width

The new, or factory reconditioned, Leica Knife has very precise wedge and cutting facet angles. These angles permit the knife to ‚meet" the glass hone plate in the correct manner for proper coarse and fine honing.

For this reason, please remember :

1. The use of only new or factory reconditioned Leica Knives in good condition is recommended. In a very few instances (where angles and configuration are similar) competitive knives may be sharpened on the Leica Knife Sharpener. Even in these cases, Leica does not guarantee optimum results. Hollow ground knives of any type simply **cannot** be sharpened satisfactorily on the Leica Knife Sharpener.
2. If your Leica Knives have been sharpened by **any** other method, they **must** be reconditioned by Leica to restore proper angles prior to sharpening on the Leica Knife Sharpener.
3. Leica Knives with large nicks in the area of the knife used for sectioning should, as a general rule, be factory reconditioned.
4. After many repeated sharpenings, the angles of coarse and fine honed cutting facets will widen excessively. At that time, the knife should be sent to the factory where the **entire** knife thickness will be ground down slightly to restore proper angle, as illustrated above.

Knives which, by sharpening or reconditioning, have eventually been reduced in size (from back to cutting edge) to 27 mm or less cannot be resharpened on the Leica Knife Sharpener nor can they be factory reconditioned.

The Leica Microtome Knife Sharpener is of durable construction with remarkable design simplicity. Except for routine cleaning and occasional lubrication, no other maintenance should be required. Even after years of use, only a few parts are likely to need replacement.

Should the occasion ever arise, the Leica Knife Sharpener can be reconditioned at the Leica factory in Nussloch, Germany or at many of the Leica Microsystems Technical Service Centres worldwide. This is a customer service provided at a nominal charge.

1 . CLEANING :

Plastic cover and outside enamelled surfaces should be kept clean. Use only warm water and detergent. Sponge out and wipe dry the catch-basin on the hone table after each sharpening session. Knife holder, knife holder shaft and exposed fittings are non-corrosive and require no attention other than normal cleaning.

2. LUBRICATION:

Lubricate two slide rods approximately once each month, depending on how extensively it is used.

Reconditioning

Leica Messerschleifdienst
Leica Biosystems Nussloch GmbH
Heidelberger Straße 17-19

D-69226 Nußloch

Telefon: (0 62 24) 143-0
Telefax: (0 62 24) 143-200

Appearance	Problem	Cause	Correction
	Fine facet fades out at ends of knife (opposite side of knife has even bevel).	Microscopic curvature on one side of knife.	Continue coarse honing.
	or		
	Fine facet fades out at centre of knife (opposite side of knife has even bevel).		
	Fine facet starts back of (away from) cutting edge.	**1.** Facet angle too wide (see page 11). **2.** I Insufficient coarse honing. (Microscopic examination would have revealed this.) **3.** Knife accidentally reversed (end for end) in holder.	**1.** Recondition at factory. **2.** Coarse hone. **3.** Repeat coarse honing cycle with knife in proper position.

These are typical sharpening problems that may be encountered. Should you ever experience an unusual sharpening situation in which you cannot identify the problem write to Leica for prompt assistance.

Warranty

Leica Biosystems Nussloch GmbH guarantees that the contractual product delivered has been subjected to a comprehensive quality control procedure based on the Leica in-house testing standards, and that the product is faultless and complies with all technical specifications and/or agreed characteristics warranted.

The scope of the warranty is based on the content of the concluded agreement. The warranty terms of your Leica sales organization or the organization from which you have purchased the contractual product shall apply exclusively.

Technical service information

If you require technical service or replacement parts, please contact your Leica sales representative or dealer who sold the product.

Please provide the following information:

- Model name and serial number of the instrument.
- Location of the instrument and name of the person to contact.
- Reason for the service call.
- Date of delivery.

Decommissioning and disposal

The instrument or parts of the instrument must be disposed of in compliance with the local laws.

10. EC Declaration of Conformity

CE

Leica MICROSYSTEMS

We herewith declare, in exclusive responsibility, that the instrument

Leica SP9000 – Automatic Knifesharper

was developed, designed and manufactured to conform with the

- Council Directive 73/23/EEC, (Low Voltage) and
- Council Directive 89/336/EEC, Appendix I (Electromagnetic Compatibility),

including their amendments up to the date mentioned below.

The following harmonized standards were applied:

- EN 61010-1: 2001
  Safety requirements for electrical equipment for measurement, control and laboratory use -
  Part 1: General requirements

- EN 61326-1:1997 + EN 61326/1:1998
  Electrical equipmentl for measurement, control and laboratory use - EMC requirements -
  Part 1: General requirements

- EN 61000-3-2:1995 + A1:1998 + A2:1998 + A14:2000
  Electromagnetic compatibility (EMC)
  Part 3-2: Limits - Limits for harmonic current emissions

- EN 61000-3-3:1995
  Electromagnetic compatibility (EMC)
  Part 3: Limits -
  Section 3: Limitation of voltage fluctuations and flicker in low-voltage
  supply systems for equirement with rated current ≤ 16 A

Leica Biosystems Nussloch GmbH
Postfach 1120
D-69222 Nussloch
October 11, 2007

Anne De Greef-Safft
President Biosystems Division

- Administrative Measures on the Control of Pollution Caused by Electronic Products -

部件名称 Name of the part	有毒有害物质或元素 Hazardous substances					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr^{6+})	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板 printed circuit boards	X	O	O	O	O	O
电子元器件 electronic components	X	O	O	O	O	O
机械部件 mechanical parts	X	O	O	X	O	O
光学元器件 optical components	X	O	X	O	O	O
电缆 cables	O	O	O	O	X	X
光源 light sources	O	X	O	O	O	O

o： 表示该有毒有害物质在该部件中的含量均在SJ/T 11363-2006 标准规定的限量要求以下。
Indicates that the concentration of the hazardous substance in all materials in the parts is below the relevant threshold of the SJ/T 11363-2006 standard.

x： 表示该有毒有害物质至少在该部件的某一材料中的含量超出SJ/T 11363-2006 标准规定的限量要求。
Indicates that the concentration of the hazardous substance of at least one of all materials in the parts is above the relevant threshold of the SJ/T 11363-2006 standard.

Note: The actual product may or may not include in all the part types listed above